

Data sheet	
status	Product specification
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# BDS943/945/947

## NPN silicon epitaxial base power transistors

### DESCRIPTION

NPN silicon epitaxial base transistors in a miniature SMD envelope (SOT223) intended for general purpose and switching applications. PNP complements are BDS944/946/948.

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage BDS943 BDS945 BDS947	open emitter	-	22 32 45	V
V <sub>CEO</sub>	collector-emitter voltage BDS943 BDS945 BDS947	open base	-	22 32 45	V
I <sub>C</sub>	collector current	average value	-	3	A
I <sub>CM</sub>	collector current	peak value	-	7	A
P <sub>tot</sub>	total power dissipation	T <sub>tab</sub> = 25 °C note 1	-	8 1.5	W
T <sub>j</sub>	junction temperature		-	150	°C
h <sub>FE</sub>	DC current gain	I <sub>C</sub> = 10 mA; V <sub>CE</sub> = 5 V	25	-	
h <sub>FE</sub>	DC current gain	I <sub>C</sub> = 500 mA; V <sub>CE</sub> = 1 V	85	475	
h <sub>FE</sub>	DC current gain BDS943 BDS945 BDS947	I <sub>C</sub> = 2 A; V <sub>CE</sub> = 1 V	50 50 40	-	

### Note

1. Mounted on PCB.

### PINNING - SOT223

PIN	DESCRIPTION
1	base
2	collector
3	emitter
4	collector

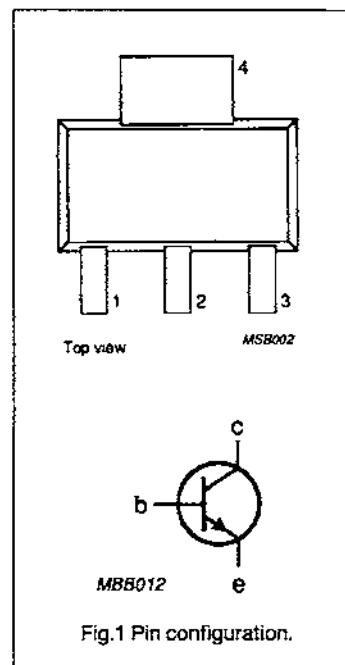


Fig.1 Pin configuration.

**NPN silicon epitaxial base power transistors****BDS943/945/947****LIMITING VALUES**

In accordance with the Absolute Maximum System (IEC 134)

<b>SYMBOL</b>	<b>PARAMETER</b>	<b>CONDITIONS</b>	<b>MIN.</b>	<b>MAX.</b>	<b>UNIT</b>
V <sub>CBO</sub>	collector-base voltage BDS943 BDS945 BDS947	open emitter	-	22 32 45	V
V <sub>CEO</sub>	collector-emitter voltage BDS943 BDS945 BDS947	open base	-	22 32 45	V
V <sub>EBO</sub>	emitter-base voltage	open collector	-	5	V
I <sub>c</sub>	collector current	average value	-	3	A
I <sub>CM</sub>	collector current	peak value	-	7	A
I <sub>b</sub>	base current		-	1	A
P <sub>tot</sub>	total power dissipation	T <sub>tab</sub> = 25 °C	-	8	W
T <sub>stg</sub>	storage temperature range		-65	+150	°C
T <sub>j</sub>	junction temperature		-	150	°C

**THERMAL RESISTANCE**

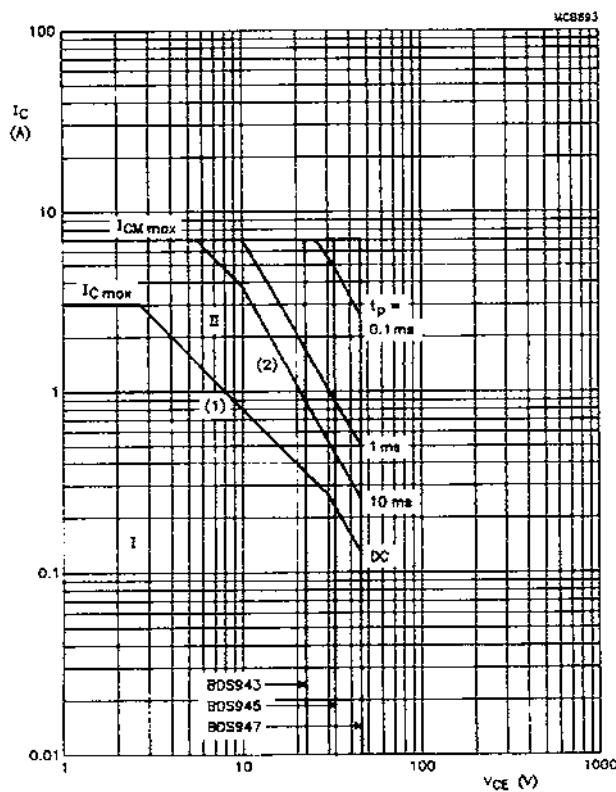
<b>SYMBOL</b>	<b>PARAMETER</b>	<b>CONDITIONS</b>	<b>NOM.</b>	<b>UNIT</b>
R <sub>th j-t</sub>	from junction to tab		15.5	K/W
R <sub>th j-a</sub>	from junction to ambient	on PCB	83.3	K/W

**NPN silicon epitaxial base power transistors****BDS943/945/947****CHARACTERISTICS** $T_j = 25^\circ\text{C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0$ ; $V_{CB} = V_{CBO \text{ max}}$	-	50	$\mu\text{A}$
$I_{CEO}$	collector cut-off current	$I_B = 0$ ; $V_{CE} = 15 \text{ V (BDS943)}$	-	0.1	mA
$I_{CEO}$	collector cut-off current	$I_B = 0$ ; $V_{CE} = 20 \text{ V (BDS945)}$	-	0.1	mA
$I_{CEO}$	collector cut-off current	$I_B = 0$ ; $V_{CE} = 25 \text{ V (BDS947)}$	-	0.1	mA
$I_{CBO}$	collector cut-off current	$I_E = 0$ ; $V_{CB} = V_{CBO \text{ max}}$ ; $T_j = 150^\circ\text{C}$	-	1	mA
$I_{EBO}$	emitter cut-off current	$I_C = 0$ ; $V_{EB} = 5 \text{ V}$	-	0.2	mA
$V_{BE}$	base-emitter voltage	$I_C = 2 \text{ A}$ ; $V_{CE} = 1 \text{ V}$ ; note 1	-	1.2	V
$V_{CE \text{ sat}}$	collector-emitter saturation voltage	$I_C = 2 \text{ A}$ ; $I_B = 0.2 \text{ A}$ ; note 1	-	0.5	V
$h_{FE}$	DC current gain	$I_C = 10 \text{ mA}$ ; $V_{CE} = 5 \text{ V}$ ; note 1	25	-	
$h_{FE}$	DC current gain	$I_C = 500 \text{ mA}$ ; $V_{CE} = 1 \text{ V}$ ; note 1	85	475	
$h_{FE}$	DC current gain	$I_C = 2 \text{ A}$ ; $V_{CE} = 1 \text{ V}$ ; note 1 (BDS943/945)	50	-	
$h_{FE}$	DC current gain	$I_C = 250 \text{ mA}$ ; $V_{CE} = 1 \text{ V}$ ; note 1 (BDS947)	40	-	
$f_T$	transition frequency	$f = 1 \text{ MHz}$ ; $I_C = 250 \text{ mA}$ ; $V_{CE} = 1 \text{ V}$	3	-	MHz

**Note**

1. Measured under pulse conditions:  $t_p < 300 \mu\text{s}$ , duty cycle < 2%.

**NPN silicon epitaxial base power transistors****BDS943/945/947**

1. Region of permissible DC operation.
2. Permissible extension for repetitive pulse operation.
  - (1)  $P_{tot\ max}$  and  $P_{peak\ max}$  lines.
  - (2) Second breakdown limits.

Fig.2 Safe operating area;  $T_{tab} = 25^\circ\text{C}$ .

## NPN silicon epitaxial base power transistors

BDS943/945/947

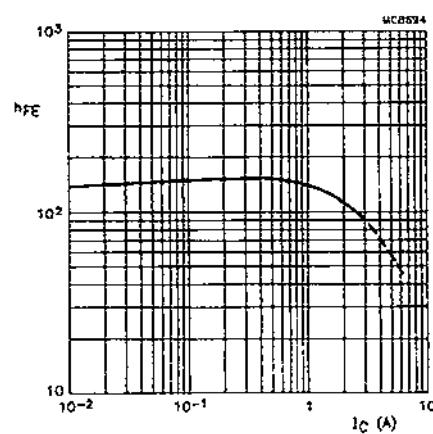
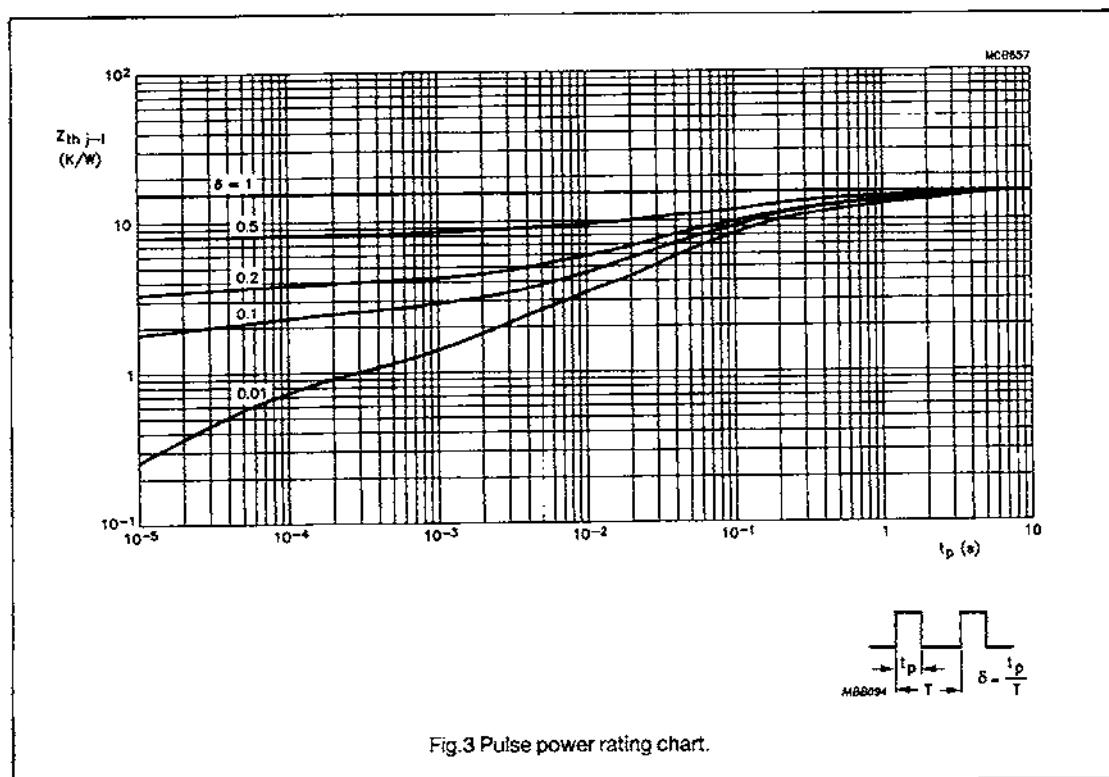


Fig. 4 Typical DC current gain;  $V_{CE} = 1$  V;  
 $T_{tab} = 25$  °C.

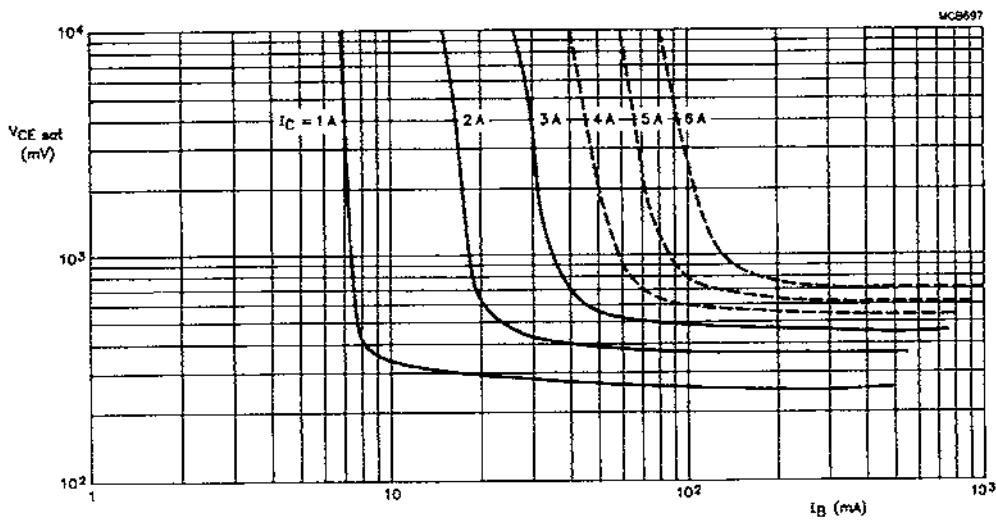
**NPN silicon epitaxial base power transistors****BDS943/945/947**

Fig.5 Typical values of collector-emitter saturation voltage at T<sub>tab</sub> = 25 °C.

**NPN silicon epitaxial base power transistors****BDS943/945/947****PACKAGE OUTLINE**

Dimensions in mm

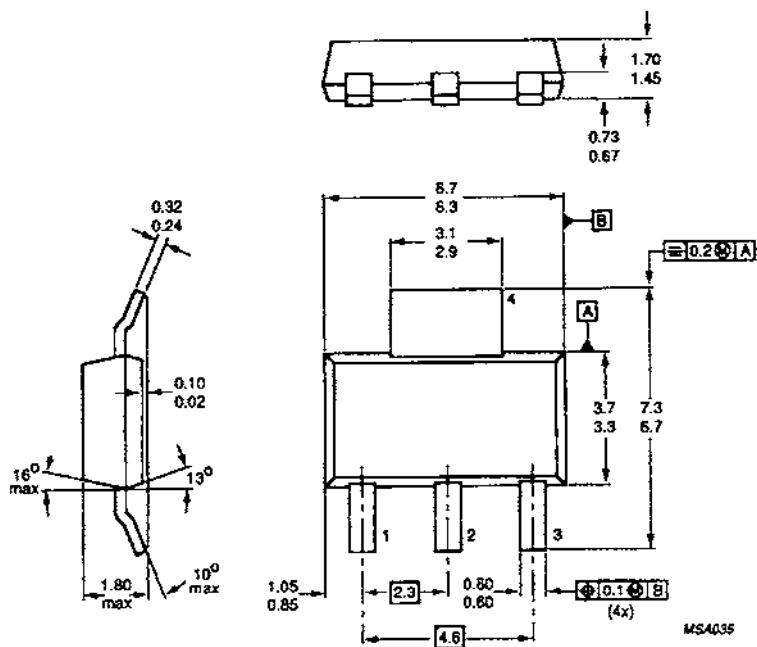


Fig.6 SOT223.